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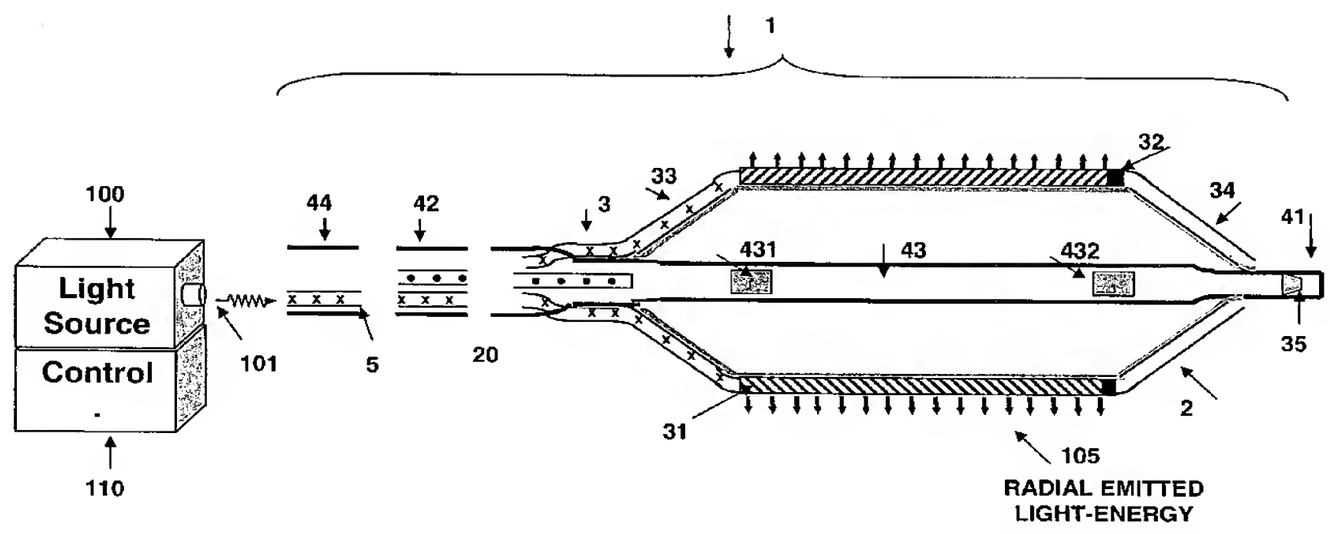
(54) Title: DILATATION BALLOON CATHETER INCLUDING EXTERNAL MEANS FOR ENDOLUMINAL THERAPY AND FOR DRUG ACTIVATION



(57) Abstract: An inflatable device to be used in treatment of stenotic lesions includes external optical fibers with a segment capable of emitting substantially uniform radial energy. The design of the optical fibers ensures a high optical coupling factor and a high efficiency in delivering light-energy to the adjacent tissue volume. A light source is connected to the optical fibers during the inflation of the device. The parameters of the light source: wavelength, waveform and intensity and the design of the optical fibers ensure that the light-tissue interaction depth is within a thin layer of stenotic lesion without inducing irreversible damage to the vessel wall. During the inflation of the device, the external optical fibers pressure the same tissue volume that interacted with the radial emitted light-energy. The confined radial light energy and the mechanical effects induced by the optical fibers create an opto-mechanical effect that facilitates the dilatation of stenotic lesions and reduces the risk of restenosis. The external optical fibers can also facilitate endoluminal drug activation, wherein light activated drugs are used to prevent restenosis or to treat cardiovascular, system, benign and malignant stenosis and other diseases. Various combinations of optical fibers with different capabilities can be used in the same device. The device can be used in treatment of stenosis in the vascular system and in non-vascular systems (such as the urinary or biliary systems). The design of the device ensures that the attachment of the external optical fibers does not obstruct the advancement and maneuvering of the device through tortuous anatomical structures such as stenotic or partially occluded blood vessels.

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